



UNITED STATES PATENT AND TRADEMARK OFFICE

T.

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,777	08/07/2003	Akiyoshi Mikami	50024-015	1705

7590 11/15/2006

McDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER

THOMPSON, CAMIE S

ART UNIT	PAPER NUMBER
----------	--------------

1774

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/635,777

Applicant(s)

MIKAMI, AKIYOSHI

Examiner

Camie S. Thompson

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment filed August 23, 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) 15-20 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 and 14 is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed August 26, 2006 are acknowledged.

Claim Rejections - 35 USC § 103

2. Claims 1-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okajima et al., U.S. Patent Number 5,700,591.

The Okajima reference discloses a light-emitting device comprising a phosphor thin film that can be used as a light-emitting layer with barrier layers (see column 2, lines 38-44). Additionally, the reference discloses that the light-emitting phosphor thin film is sandwiched by barrier layers wherein materials having identical crystal structure for both the phosphor thin film and for the barrier layers (see column 2, lines 30-38). Column 2, lines 30-64 of the Okajima reference discloses that the materials having the identical structure for both the phosphor thin film and for the barrier layer increase light-emitting brightness and efficiency. The reference also discloses in column 2 that better light emission characteristics were observed when the phosphor thin film and the barrier layer had rock salt type crystal structures. Column 4, lines 38-58 of the reference discloses that the barrier layers can be $\text{Ca}_{0.6}\text{Mg}_{0.4}\text{S}$. The reference also discloses that the phosphor thin film layer can be composed of $\text{Zn}_{0.7}\text{Cd}_{0.3}\text{S}$ with a Ag luminescent center (see Figure 1). The reference also discloses that the energy gap of the barrier layers is greater than that of the phosphor thin film (see column 2, lines 4). Okajima also discloses that Si can be used

Art Unit: 1774

as a substrate (underlayer). As shown in Figure 1 of the reference the light emitting layer comprises the phosphor thin layer and the barrier layers and the substrate can be GaAs (underlayer). The instant claims do not limit the amount of layers in the light emitting layer. However, the reference does disclose that the barrier layer can have an identical crystal structure as that of the phosphor layer and are included as the light-emitting layer. Figure 1 of the reference shows the light emitting layer with the phosphor thin layers as well as the barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art to recognize from Figure 1 that the thickness of the light emitting layer has greater thickness than that of the underlayer (GaAs substrate) since the light emitting layer includes the phosphor thin layers and the barrier layers that have identical crystal structure.

3. Claims 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not provide for the recited inorganic electroluminescent device further including a luminescent center being selected from the group consisting of europium, cerium and manganese.

4. Claims 13-14 are allowed. The prior art does not provide for the recited inorganic electroluminescent device further including a second compound semiconductor containing $\text{Mg}_{1-x}\text{Ca}_x\text{S}$ wherein the Ca composition ratio x is $0.1 \leq x \leq 0.15$ and a luminescent center, Eu, is doped into $\text{Mg}_{1-x}\text{Ca}_x\text{S}$ and the composition ratio of europium to Mg is not larger than 0.1

Response to Arguments

5. Applicant's arguments filed August 29, 2006 have been fully considered but they are not persuasive. Applicant argues that Okajima reference does not disclose that the thickness of the light emitting layer is larger than the thickness of the underlayer. Okajima discloses the light emitting layer is comprised of barrier layers and phosphor thin film layers. The reference also discloses that the phosphor thin film layers and the barrier layers can have the same crystal structure. The present claims do not limit the light emitting layer as only one layer. The reference discloses that the substrate (underlayer) can be GaAs. Figure 1 of the reference shows the light emitting layer, which includes the phosphor thin film layers and the barrier layers, as being thicker than that of the underlayer (GaAs substrate). The rejection is maintained.


6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1774

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (571) 272-1530. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena L Dye, can be reached at (571) 272-3186. The fax phone number for the Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


RENA DYE
SUPERVISORY PATENT EXAMINER
Art Unit 1774
11/9/07